

CLAIMS

1. A method comprising:
drawing fluid containing particulate matter from a container;
passing the fluid through a first housing having a chamber containing chromatographic bed material;
allowing the chromatographic bed material to freely mix with the fluid;
separating the first housing containing the chromatographic bed material from the pump;
connecting a second housing to the pump, said second housing having a filter membrane for capturing cells in the fluid in a single layer disposed in the second housing; and
drawing fluid containing cells from the container through the second housing under conditions which allow cells in the fluid to be collected in a single layer on the filter membrane.
2. The method of claim 1 wherein allowing the chromatographic bed material to freely mix with the fluid includes capturing particulate matter on the chromatographic bed material.
3. The method of claim 2 wherein capturing particulate matter on the chromatographic bed material includes determining the presence of particulate matter in the fluid.

4. The method of claim 3 wherein determining the presence of particulate matter in the fluid includes determining the presence of a specific analyte.

5. The method of claim 3 wherein determining the presence of particulate matter in the fluid includes determining the presence of multiple analytes.

6. The method of claim 1 wherein the particulate matter includes at least one ligand and cells.

7. The method of claim 1 wherein passing the fluid from the container includes drawing the fluid through at least one of the first housing, the second housing, or a combination of the first housing and the second housing, and drawing the fluid into a pump.

8. The method of claim 7 wherein the pump is a syringe.

9. The method of claim 7 wherein drawing the fluid from the specimen cup includes drawing the fluid through a first housing containing a solid phase extraction element.

10. The method of claim 7 wherein drawing the fluid from the container includes drawing the fluid through a first housing containing an antigen capture element.

11. The method of claim 1 wherein drawing the fluid from the container includes drawing the fluid through a first housing containing beads.

12. The method of claim 1 wherein drawing the fluid from the container further includes buffering the fluid.

13. The method of claim 1 wherein drawing the fluid comprises drawing a biological fluid.

14. The method of claim 1 wherein drawing the fluid comprises drawing urine.

15. The method of claim 1 wherein drawing the fluid from the container through a first housing includes drawing fluid and chromatographic bed material into the pump.

16. The method of claim 15 wherein drawing the fluid from the container through the first housing further includes concentrating the particulate matter in the fluid.

17. The method of claim 1 wherein concentrating ligand in the fluid includes concentrating the ligand by at least 500 times.

18. The method of claim 1 wherein concentrating ligand in the fluid includes concentrating the ligand by at least 1000 times.

19. The method of claim 2 wherein capturing particulate matter on the chromatographic bed material includes subjecting the particulate matter to microbiological examination.

20. The method of claim 19 wherein subjecting the particulate matter to microbiological examination includes determining the presence of various antigens.

21. The method of claim 7 wherein drawing the fluid into the pump includes mixing the fluid with the chromatographic bed material.

22. The method of claim 7 wherein drawing the fluid into the pump includes emptying and refilling the pump at least twice.

23. The method of claim 1 further comprising storing the first housing prior to subjecting the first housing to microbiological examination.

24. The method of claim 1 further comprising exposing the particulate matter captured in the first housing to an eluting buffer.

25. A method comprising:

using a pump, drawing fluid containing a ligand and cells from a specimen cup;

passing the fluid through a first housing having a chamber containing chromatographic bed material, and into the pump, under conditions which allow the ligand to bind to the chromatographic bed material;

separating the first housing containing the chromatographic bed material from the pump;

connecting a second housing to the pump, said second housing having a filter membrane for capturing cells in a monolayer disposed in the second housing; and

using the pump, drawing fluid containing a ligand and cells from the specimen cup through the second housing under conditions which allow cells in the fluid to be collected in a monolayer on the filter membrane.

26. A method comprising:

using a pump, drawing fluid containing a ligand and cells from a specimen cup;

passing the fluid through a first housing having a chamber containing chromatographic bed material, and into the pump, under conditions which allow the ligand to bind to the chromatographic bed material;

reversing the direction of the fluid flow and passing the mixture of the chromatographic material and the fluid sample into

the first housing;

separating the first housing containing the chromatographic bed material from the pump;

connecting a second housing to the pump, said second housing having a filter membrane for capturing cells in a monolayer disposed in the second housing;

using the pump, drawing fluid containing cells from the specimen cup through the second housing under conditions which allow cells in the fluid to be collected in a monolayer on the first membrane; and

separating the second housing containing the collected cells from the pump.

27. The method of claim 26 wherein the first and second housing are processed at the collection site.

28. The method of claim 27 wherein at least one housing is transported to a distant site for further testing.

29. An apparatus comprising
a plurality of stacked specimen collection containers in fluid communication with one another, each container having an inlet and an outlet and defining at least one fluid flow path through the container, at least one container having chromatographic bed material for capturing particulate matter and cells.

30. The apparatus of claim 29 further comprising at least one specimen collection container having a membrane which captures cells.

31. The apparatus of claim 29 wherein a container having chromatographic bed material for capturing particulate matter includes chromatographic bed material for determining the presence of a specific analyte.

32. The apparatus of claim 29 wherein a container having chromatographic bed material for capturing particulate matter includes chromatographic bed material for determining the presence of multiple analytes.

33. The apparatus of claim 29 further comprising a container housing having a second inlet and a second outlet and having a filter membrane for capturing cells disposed between the second inlet and the second outlet.

34. The apparatus of claim 33 wherein the second inlet is adapted to communicate with a specimen cup, the second outlet is adapted to communicate with the inlet, and the outlet is adapted to communicate with a pump.

35. The apparatus of claim 33 wherein the membrane for capturing cells is adapted to capture the cells in a single layer.

36. The apparatus of claim 29 wherein the container having chromatographic bed material includes a membrane which allows the bed material to pass freely out of the outlet.

37. The apparatus of claim 36 wherein the container having chromatographic bed material includes a membrane which prevents the chromatographic bed material from passing into the inlet.

38. An apparatus comprising:

a first housing having a first inlet and a first outlet and having a filter membrane for capturing cells disposed between the first inlet and the first outlet; and

a second housing having a second inlet and a second outlet and having a chromatography element disposed between the second inlet and the second outlet.

39. The apparatus of claim 38 wherein the first inlet is adapted to communicate with a specimen cup.

40. The apparatus of claim 38 wherein the first outlet is adapted to communicate with a pump.

41. The apparatus of claim 38 wherein the second inlet is adapted to communicate with a specimen cup.

42. The apparatus of claim 39 wherein the specimen container includes a lid having a tube extending into the container, said tube having at least two perforations extending along its length.

43. The apparatus of claim 38 wherein the second outlet is adapted to communicate with a pump.

44. The apparatus of claim 29 wherein the specimen collection containers are removable from the apparatus.

45. An apparatus comprising:

a first housing having a first inlet and a first outlet and having a filter membrane for capturing cells disposed between the first inlet and the first outlet;

a second housing having a second inlet and a second outlet and having chromatographic bed material disposed between the second inlet and the second outlet; and

a specimen container having a lid suitable for fluid communication with the first inlet or the second inlet, said lid having a tube extending into the container, said tube having at least two perforations extending along its length.

46. A method comprising:
drawing fluid containing an analyte from a container;
passing the fluid through a first housing having a chamber containing chromatographic bed material;
allowing the chromatographic bed material to freely mix with the fluid;
separating the first housing containing the chromatographic bed material from the pump;
connecting a second housing to the pump, said second housing having a filter membrane for capturing an analyte in the fluid in a single layer disposed in the second housing; and
drawing fluid containing an analyte from the container through the second housing under conditions which allow an analyte in the fluid to be collected in a single layer on the filter membrane.

47. The method of claim 46 wherein capturing an analyte on the chromatographic bed material includes determining the presence of an analyte in the fluid.

48. The method of claim 47 wherein determining the presence of an analyte in the fluid includes determining the presence of a specific analyte.

49. A kit comprising a syringe, a chromatography housing, an assay housing, a cytology housing, or combinations thereof.